

THE BONE METASTASES OF HYPERNEPHROMA.

A REPORT FROM THE MASSACHUSETTS GENERAL HOSPITAL CLINIC.*

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PREVIOUS to 1883 new growths of the kidney were not very accurately differentiated. Lipoma, sarcoma, adenoma, adenocarcinoma, angioma, angiosarcoma, myxoma, endothelioma, were a few of the terms applied to kidney tumors.

In 1883 Grawitz¹ described a tumor of the kidney similar in structure to the adrenal and traced its origin to adrenal tissue.

Birch-Hirschfeld, in 1896, called these tumors arising from adrenal tissue, hypernephromata. The term hypernephroma, therefore, is applied to all tumors of adrenal origin. They may arise either from the normally-seated adrenal body or from ectopic fragments of the adrenal body, the so-called adrenal rests. Because of the very intimate developmental association of the adrenal body and the genito-urinary apparatus bits of adrenal tissue are frequently found included within certain organs, notably the kidney, the ovary, the testicle, the uterus. Thus is explained the occurrence within these organs of tumors resembling adrenal tissue.

In size, a hypernephroma may be as small as a pea or as large as a child's head. It is not uncommon to discover, at autopsy, tiny adrenal kidney rests which have remained in the kidney without causing symptoms. A hypernephroma, developing slowly in the kidney, may remain symptomless for years. Finally it may grow rapidly and become malignant.

* NOTE.—I wish to thank my colleagues of the Surgical Staff who have permitted me to record here cases occurring in their hospital services.

¹ Virch. Archiv., xciii, 39, 1883.

Malignancy manifests itself in three ways: (1) By local destruction of tissue after breaking through the capsule; (2) by metastases; and (3) by a general toxemia.

The important symptoms and signs of a hypernephroma are hæmaturia, renal colic and tumor.

Hæmaturia is occasioned by hæmorrhage from the new growth which has extended into the pelvis of the kidney. Hæmaturia is variable in time and quantity. Hæmaturia appears at intervals and lasts but a short time. The absence of hæmaturia does not mean that the kidney is free from the growth. In the case here recorded hæmaturia is absent and yet the tumor is present.

Renal colic is caused by the passage of ureteral blood clots. Pain may be occasioned by the stretching of the tumor capsule. In the case here recorded there has been no pain referable to the kidney or loin. The tumor may be discovered, as in the present case, before any other sign of the kidney lesion is present. The general pallor of the present patient is characteristic. Blood changes, other than a low hæmoglobin, are not present.

The metastases of the hypernephromata are most interesting. Neusser calls attention to the fact that apparently benign hypernephromata are capable of giving rise to metastases larger than the primary growth. Metastases are found most often in the lungs, the liver and the bones. Almost any of the tissues of the body may be invaded. It is generally thought that the mode of metastasis is through the blood by way of the renal vein. Extension is thought to occur rarely through the lymphatics. Many specimens exist in which the growth is seen extending directly into the renal vein.

In my service at the Massachusetts General Hospital, during the past three years, there have been three cases of hypernephroma. I wish to record in detail one of these cases (Case XI of the M. G. H. series) as it is of especial interest:

CASE XI.—Massachusetts General Hospital, No. 144,138.



FIG. 1.—Case XI: X-ray of upper end of humerus, showing region of tumor, D, C. A, Clavicle; B, Acromion; C, Shaft of humerus; D, Head of humerus.

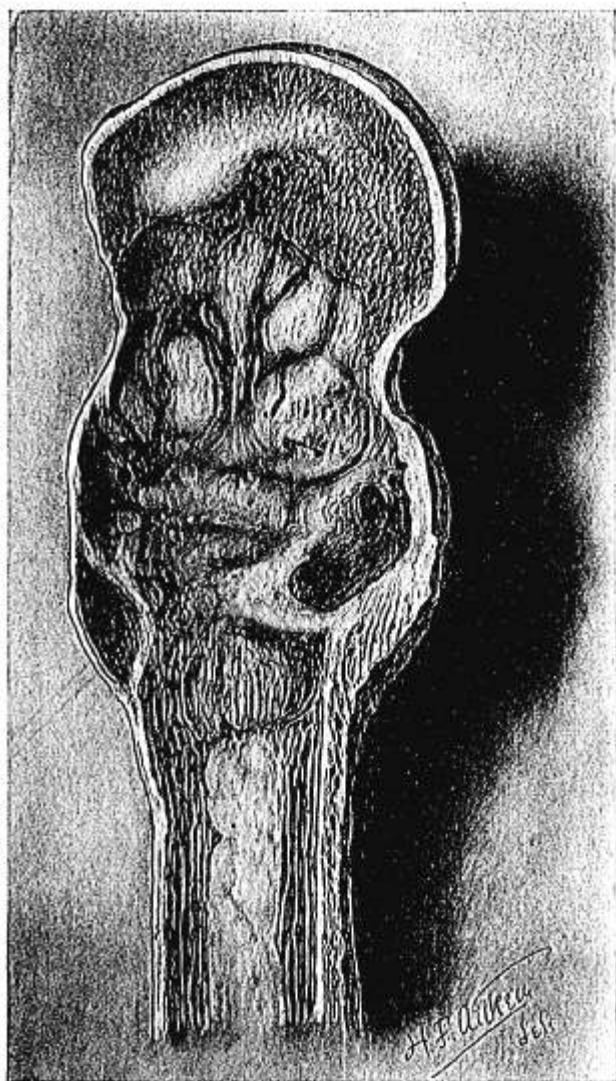


FIG. 2.—Case XI: Hypernephroma, metastatic in upper end of the shaft of the right humerus.
Drawing made from a section of the gross specimen.

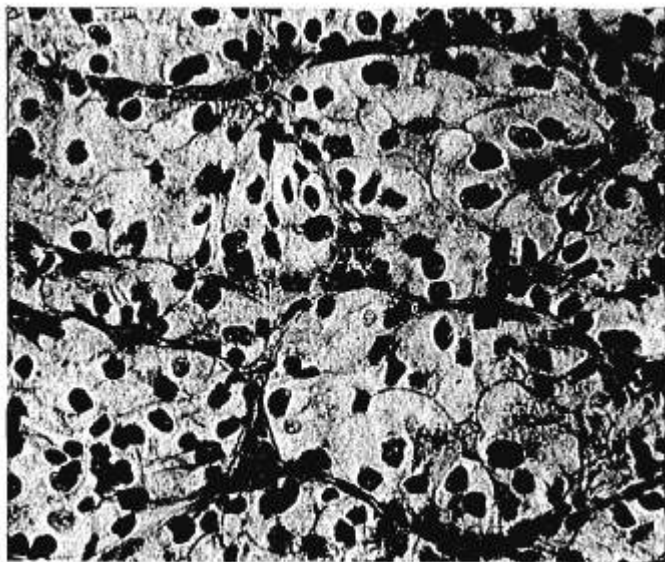


FIG. 3.—Case XI: Microphotograph of a section from metastatic hypernephroma in upper end of humerus. Oval polygonal cells—preservation of rim of cytoplasm, deeply staining nucleus, perinuclear lightly staining spaces. Microphotograph by Mr. Brown, M. G. H. Laboratory.

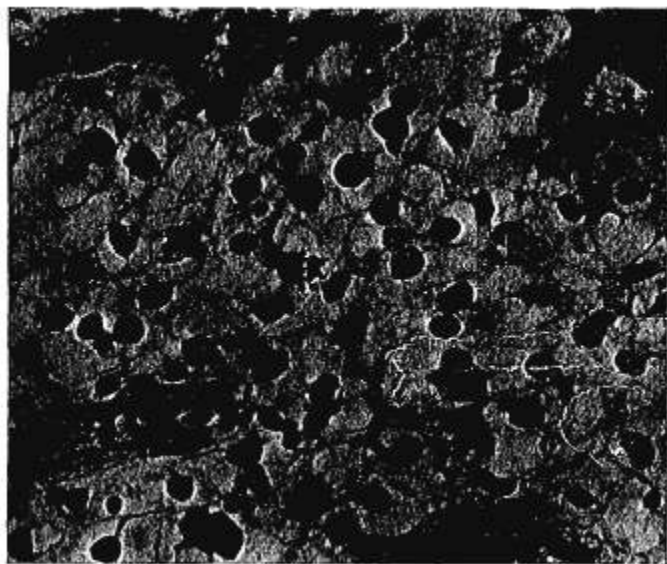


FIG. 4.—Case XI: Microphotograph of a section from metastatic hypernephroma in upper end of humerus. Higher power than in previous plate, No. 3.

September, 1905. J. J. A., a man thirty-four years old. Has always been well and strong. For eleven months he has had pain and discomfort about the right shoulder joint. The shoulder has been sore and stiff. The impairment of motion has been in the extremes of movement. There is an atrophy of the scapular muscles. At the upper end of the shaft of the right humerus is a tumor, which is not particularly tender upon pressure.

The X-ray defined the tumor accurately. (See Figure 1.) Before operation it was thought to be a sarcoma of the humerus. An amputation at the shoulder joint determined that the joint was uninvolved by the disease. The microscopical report discovered that the growth was a hypernephroma. (See report.)

Palpation of the abdomen after operation discovered for the first time a slightly movable and enlarged left kidney. There were no signs or symptoms attracting attention to the kidney. The urine was normal.

The man recovered from the operation. Recent examination one year after the operation finds the man in fair health and about as well and strong as usual, although he is extremely pale and cachectic-looking.

Pathological examination and report by Dr. C. C. Simmons. The specimen consisted of the whole upper extremity, including the head of the humerus (see Fig. 2). On section at the surgical neck there was a fracture through the tumor mass. Occupying the shaft beneath the surgical neck and extending from the head downwards for 6 cm. was a soft grayish-white new growth which had distended the medullary canal and absorbed the greater part of the cortex. The bone at the center of this growth was 5 cm. in diameter. No infiltration of the soft parts could be made out, and the growth did not involve the shaft of the bone below the site of the main tumor.

Microscopic examination (see Figs. 3 and 4) showed solid masses of large round cells having an alveolar arrangement and separated by many fine blood-vessels and fine bands of fibrous tissue. The cells were round, with somewhat vesicular nuclei and a comparatively large amount of clear, fatty degenerated protoplasm having a definite outline. The tumor represents a sarcoma and is highly suggestive of metastasis from a hypernephroma. Sarcoma (hypernephroma).

It was thought, at the time of examination and previous to

operation, that this tumor of the upper end of the humerus was a sarcoma.

In a paper, "A Study of Certain Cases of Sarcoma of the Long Bones, from the Massachusetts General Hospital Clinic," published in the *Boston Medical and Surgical Journal* in June, 1904, the conclusion was reached that in cases of sarcoma, amputation at the joint above the disease is wise, if the disease is high in the shaft, and limited. Consequently, in this case amputation at the shoulder joint was done. A fact of interest connected with this case is that the tumor of the humerus was the first evidence or sign of the disease.

Certain questions of practical importance arise: What is the proper attitude toward this kidney-tumor, as yet manifesting no sign? Shall it be removed by nephrectomy? If it is removed what will be the prognosis?

The very great proneness of the hypernephromata to metastases, as demonstrated by autopsy reports and the fact that the metastases are usually multiple, would lead one to give an unfavorable prognosis in this case were it not for a series of very careful observations by Albrecht² from Hochenegg's clinic in Vienna.

Albrecht finds that in two cases of Hochenegg, in which complete autopsy returns have been made, the bone metastasis was the *sole* metastasis. This observation is of importance. These cases were as follows:

Hochenegg (reported by Albrecht), Case II, a *skull sarcoma* was operated upon and died. A complete autopsy showed no other metastases. Case V, a nephrectomy. Four months following the nephrectomy a metastasis appeared in the *occipital* bone, and six months after the appearance of this metastasis a complete autopsy found no other metastases.

In view of these observations of Albrecht it is possible that in the case reported the metastatic growth in the humerus is the only metastasis present. If so, nephrectomy is indicated.

² Arch. f. klin. Chir., 1905, lxxvii, 1073; with bibliography.

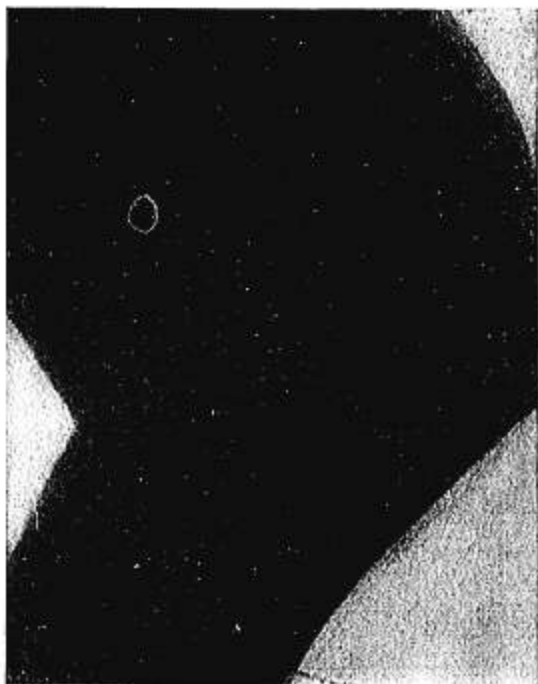


FIG. 5.—Hochenegg's Case No. 4: Reported by Albrecht. 60 years old. Radiograph. Hypernephroma of femur. Spontaneous fracture of femur. Amputation of thigh. 5½ years subsequently tumor of kidney apparent. Complete autopsy. Metastases elsewhere.



FIG. 6.—Hochenegg's Case No. 7: Reported by Albrecht. 42 years old. Hypernephroma of parietal and frontal bones. Death, complete autopsy.



FIG. 7.—Hochenegg's Case No. 16: Reported by Albrecht. 66 years old. Radiograph of hypernephroma of clavicle.



FIG. 8.—Hochenegg's Case No. 16: Reported by Albrecht. 66 years old. Hypernephroma of clavicle recurrent.

In collecting and studying certain of the cases of hypernephromata which have appeared at the Massachusetts General Hospital Clinic, I find, all together, eleven cases. A careful microscopical study of each of these cases was made by Dr. Whitney or Dr. Wright or Dr. Simmons. The end results are known in all of these cases. Excepting the case here recorded, all of these patients are dead or are reported (two of them) dying. Such is the mortality of the malignant hypernephromata!

Bone metastases were present in three of these cases, in addition to the case here recorded in detail. In one case the metastasis was in the frontal bone and humerus—Case II. In another case the metastasis was in the humerus—Case X. In the third case the metastasis was in the femur—Case IX.

Albrecht records four cases with bone metastases, besides the two cases already mentioned in which the bone metastases were the sole metastases. These four cases with bone metastases were briefly as follows:

(The numbering of these cases corresponds to Albrecht's series.)

IV. A woman sixty years old presented a spontaneous fracture of the *left femur*. An amputation was done in the upper third of the thigh for sarcoma of the femur. Recovery from operation; five and a half years later a kidney tumor, hypernephroma, was discovered; complete autopsy was done. The urine was always negative. (See Fig. 5.)

VII. A man forty-two years old presented *frontal and temporal bone* hypernephromata. An attempt was made to remove the growth. He died after operation. Autopsy discovered a hypernephroma. The urine contained albumin. (See Fig. 6.)

XV. An adult, forty-eight years old, presented what was thought to be a fungus disease of the *knee-joint*. The thigh was amputated. Death occurred. The tumor proved to be a hypernephroma metastasis. The urine contained some leucocytes and cells which might have been interpreted as tumor-cells.

XVI. A woman, sixty-six years old, presented what was thought to be a cold abscess over the *clavicle*, with a tubercular periosteitis. An attempt at removal was followed by recurrence and death. A complete autopsy discovered a hypernephroma and microscopical examination demonstrated the tumor of the clavicle to be a hypernephroma metastasis. The urine contained a few leucocytes. (See Figs. 7 and 8.)

There are five other cases of bone metastases in literature,

viz., Loewenhardt,³ from Helferich's clinic, reports a *clavicle* metastasis resembling Hochenegg's Case XVI; von Bergmann's clinic⁴ reports a pulsating *tibial* tumor; Israel⁵ reports a case in which the metastases in the *rib* and *thigh* were the first signs of hypernephroma. Küster⁶ reports two cases in which the metastasis was the first sign in one case in the *calvarium*, and in the other case in the *rib*.

So far as I have been able to determine there are, therefore, recorded of bone metastases, six cases from Hochenegg's clinic, five cases from literature, and four cases from the Massachusetts General Hospital clinic, fifteen cases altogether. There are doubtless other cases, but none in which the records are complete or the authority satisfactory.

The practical suggestions from this review of the metastases of the hypernephroma are: A bone metastasis may be the first sign of a hypernephroma. A bone tumor in a middle-aged or elderly person should suggest a metastatic hypernephroma, for a primary bone tumor in elderly people is uncommon. The bone metastasis from a hypernephroma may be the only metastasis. A hypernephroma may exist without symptoms for a considerable period. The kidney region should be palpated with great care in every case of tumor of bone.

A very complete bibliography is to be found at the end of the paper by Keen, Pfahler and Ellis in *American Medicine*, vol. viii, No. 25, December 17, 1904.

Thorndike and Cunningham present a valuable paper upon hypernephroma in the *Boston Medical and Surgical Journal*, vol. cxlix, No. 23, pp. 611-616, Dec. 3, 1903.

MASSACHUSETTS GENERAL HOSPITAL CASES OF HYPERNEPHROMA.

CASE I.—*Hypernephroma (left), hæmaturia, lumbar pain, nephrectomy. Recurrence in loin five years later. Death.* J. R.

³ Deutsche Zeitschr. f. Chir., bd. 28, 1888.

⁴ Verhandlungen des 16 Congressen der Deutschen Gesellschaft f. Chir., 1887.

⁵ Archiv. f. klin. Chirurg., bd. 47.

⁶ Deutsche Chirurg., 1896-1902.

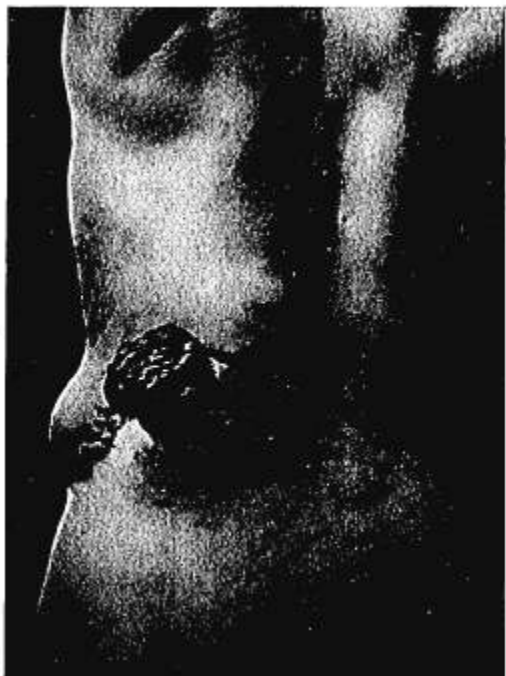


FIG. 9.—Case No. 1: Recurrent hypernephroma of loin.

O., a man, forty-nine years old and married. M. G. H. records, vol. 338, p. 143, and vol. 512, p. 57, 1898. The patient has had indefinite pain in the back for a long time. Two months ago he had a painless hæmaturia, lasting four days. One week later he had hæmaturia again, this time with clots in the urine and severe pain in the left lumbar region requiring morphia. The left kidney was found enlarged and sensitive. Two weeks ago he again had pain in the left lumbar region, requiring morphia for two days.

The patient is well developed and nourished. The heart and lungs are negative. On bimanual palpation of the left lumbar region the kidney can be palpated with difficulty. There is a little tenderness over the left kidney. The X-ray shows a slight haziness upon the left side, but no calculus. Urinary examination: normal; acid, 1016; albumen, $\frac{1}{10}$ per cent. Sediment normal blood, much pus, free and in clumps, few squamous cells.

Operation by Dr. F. B. Harrington. Nephrectomy.

Pathological Report.—The specimen consisted of a kidney, and extending from one extremity downwards, filling up the hilus, is an irregularly-shaped mass the size of an orange, arising from the adrenal body. On section this showed numerous cysts, some of which contained blood, others a clear fluid. Numerous areas of fatty degenerated adrenal tissue appeared. The diagnosis of sarcoma was made at this time.

In 1905, almost six years following the nephrectomy, the patient complains of pain and persistent hæmaturia. Up to a year ago he felt pretty well. One year ago he had noticed a swelling at the site of the wound and pain across the back, which sometimes shoots down into left thigh. Both pain and swelling have increased very much this past year.

The palpable and visible tumor is shown in the photograph (Fig. 9). A piece was removed for examination in the service of Dr. Scudder.

Pathological report of recurrence in loin June 6, 1905. Two pieces of tissue, the largest, 3x2 cm. in diameter, consisting of skin and subcutaneous tissue, in which was a nodule of grayish-white growth.

Microscopic examination by Dr. W. F. Whitney shows an alveolated structure, with spaces filled with large cells with a clear body and a relatively small, dark, deeply-staining nucleus.

Diagnosis.—Secondary hypernephroma. This patient was sent home to die from the hospital.

CASE II. *Hypernephroma (left). Many metastases. Excision of frontal bone tumor. Blindness. Death.* A woman, forty years old and married. M. G. H. records, vol. 429, p. 189, and vol. 435, p. 13, 1903. The patient has had no serious illnesses. For six years she has had headaches, which have been very severe for the past year. She has had no nausea. For six months she has had vague "mental symptoms." Four months ago there appeared a swelling over the left frontal eminence, the size of a small egg. The frontal tumor was removed yesterday by her doctor, who found an opening from it into and through the frontal bone. Great hæmorrhage. Sent to the hospital.

The patient is a pale, thin, nervous woman. Reflexes present. Heart rapid, no murmurs, no enlargement. Lungs negative. Further operation is thought inadvisable, as the wound is healing. It is thought that the growth might have been specific in character. Given iodide of potash.

Examination of the urine; pale, acid, 1023, slightest possible trace of albumen, sugar absent; sediment, a rare granular cast, some small round cells, abundant squamous epithelial cells, many uric acid crystals.

A small, firm lump has recently appeared over the right eyebrow. It is not tender. She was discharged from the hospital without operation. One month later, in April, 1903, she reentered the hospital.

At the seat of the old operation is a bluish, fluctuating tumor the size of an English walnut, slightly painful upon pressure. Over the right eye is a tumor, described above, slightly movable, about the size of a small marble. On the right parietal bone is a third similar tumor of smaller size. An indefinite mass can be felt in the left side of the abdomen under the costal border, which is slightly tender on pressure. The chest on the left side is dull to the eighth rib in the axillary line. The deltoid muscle of the left arm is considerably atrophied. Upon the left shoulder, in the region of the great tuberosity of the humerus, is a hard, rounded tumor about the size of a small egg. The tumor is not painful upon pressure. There was no relief from X-ray treatment. All the tumors were increasing in size. The patient was anxious to have an operation.

The tumor over the right eye was removed by Dr. M. H. Richardson. The growth was found to have perforated the frontal bone.

The patient lost in strength, and about three weeks after the operation died, totally blind, April, 1903.

The left chest was flat to the fifth rib in the axillary line. There was a high temperature.

Report by Dr. J. H. Wright from the Clinico-Pathological Laboratory.—The specimen received for examination contains several small tumors, the largest about 7 mm. in diameter and situated in what seems to be subcutaneous connective tissue. The tumors consist of closely packed cells of atypical character, having vesicular nuclei and considerable cytoplasm. A good many small blood-channels permeate the tumors. Some of these appear to be lined with a delicate endothelium. The tumors are regarded as sarcomatous in character and not inconsistent with hypernephroma.

CASE III.—M. H., a woman, forty-one, single. June 5, 1903, M. G. H. records, vol. 442, p. 203. The patient has been running down in general health for the past two years. She worked up to one year ago. Eight months ago she noticed a "lump" in the left side, which has grown steadily larger. No pain is felt in this "lump." For the past three weeks her belly-wall has been tense. She has lost much weight. There has been frequency of micturition during the past few months. She has had to sit erect at night in order to breathe with ease.

Patient is a poorly developed and nourished person. A pre-systolic heart-murmur is heard, which is transmitted into the axilla. The chest is apparently normal. The abdominal walls are tense. The abdominal tumor is about the size of a twin pregnancy at term. The girth is 42½ inches. There is a fluctuation wave over the whole abdomen. All the pelvic structures are pushed down into the pelvis.

June 6, 1903. Operation. Nephrectomy by Dr. C. L. Scudder. Six to eight quarts of a free brownish fluid in the abdominal cavity. Colon displaced toward median line.

Death June 10, 1903, five days after the operation, due to weakness and shock.

Pathological report by Dr. W. F. Whitney.—A kidney, in which was a very large new growth, which weighed 2280 grams. On section it was very soft, medullary in character, and of a rather variegated surface, in which yellow and red extensively predominated. The kidney was about half destroyed and into

the pelvis of the kidney projected masses of new growths, as well as into the lumen of the renal veins.

Microscopic examination June 6, 1903, showed a reticulated fibrous structure, among which were large cells with rather clear protoplasm and large nuclei and nucleoli.

Diagnosis.—Hypernephroma.

CASE IV.—M. M. R., 40 years old, a widow. June 21, 1904. M. G. H. records, vol. 46, p. 108. She has always had fair health. Last year, before Christmas, the patient first noticed a dull, constant pain in the region of the left kidney, sometimes shooting into both groins. The pain sometimes caused vomiting. Frequency of micturition at night and a very great variation in the amount of urine passed upon different days has been noticed by the patient ever since the beginning of the pain. She has lost weight for the past six months. The abdomen is not distended. Below the floating ribs upon the left is an area of marked tenderness which corresponds to a tumor of the left kidney.

Operation.—Nephrectomy by Dr. W. M. Conant. A hard mass was felt in the lower end of the kidney. The renal vessels were controlled by pressure of the fingers, and the kidney cortex was split over the mass. This mass was found to consist of a rounded, firm tumor about the size of an ovary; it was easily shelled out. The rents in the pelvis and kidney were closed.

Dr. J. H. Wright reports that the diagnosis is hypernephroma. This patient died a few months after the operation.

CASE V.—L. C., woman, forty years old, married; July, 1904. M. G. H. records, vol. 480, p. 97. The family history is negative. The patient's history: cholecystotomy for gall-stones eight years ago. No catamenial period for one year. Three children living. Has lost about sixty pounds in weight during the past two years. She has pain in the lower part of the abdomen, a bearing-down sensation and no appetite. The bowels are regular and she sleeps fairly well. Nothing abnormal in heart or lungs. Abdomen prominent and tense from distention. An umbilical incarcerated omental hernia size of a walnut is evident. Abdominal asymmetrically distended to left of median line, not tender. Exploratory laparotomy by Dr. C. L. Scudder. Much thickening of the anterior parietal peritoneum. Encysted peritonitis toward the pelvis. Upon the peritoneum of the intestine were numerous white opaque spots the size of a pin-

head, slightly raised above the surface. On the side of each ovary was a mass, two inches in diameter, papillomatous in appearance, hard and white. Small section of mass on left taken for examination. Nothing abnormal was felt in the liver. It seemed probable that the ovarian masses and the disseminated spots upon the peritoneum were malignant, therefore no further operation was deemed wise.

She died March 4, 1905.

Pathological Report.—Two small irregular masses of tissue from the abdominal cavity. One was of irregular shape, 2x4 cm. in diameter, and consisted of soft, friable translucent tissue. The other piece was firmer and of opaque, grayish white color, 1x2 cm. in diameter.

Microscopic examination showed nests of cells having in some places a glandular arrangement and in other places being arranged in columns separated by a small amount of fibrous tissue. The cells were large, with rounded nuclei and considerable protoplasm which, in some, showed fatty degeneration. In some places the cells were in large masses and showed a smaller amount of protoplasm. These larger masses were separated by cellular myomatous tissue. Hypernephroma.

(Signed) W. F. WHITNEY, M.D.

CASE VI.—S. P. H., a woman, fifty-eight years old, unmarried. M. G. H. records, vol. 479, p. 71. August, 1904. Family history negative. Patient's history: measles, chicken-pox, scarlet-fever at three years, after which was somewhat deaf. Climacteric five years ago. Some indigestion; always constipated; drinks considerable tea. Fifteen months ago weighed 198 pounds, now weighs 138 pounds and has lost fifteen pounds in the last six months. Six weeks ago had pain in the right side and noticed a bunch about the size of a hen's egg. "Felt bad," no appetite, nausea and slight vomiting. The lump has grown steadily. The heart has a systolic murmur, heard loudest at the base, not transmitted; the lungs are normal. The abdomen is large and flabby. On the right side, just opposite the level of the umbilicus, was a rounded tumor, with several lobes, about the size of a large grape-fruit. It extends from the region of the right kidney to the anterior abdominal wall, with a space separating it from the liver and considerable space between it and the pelvis. It extends to

the median line. On inflation of the colon the tumor lies to the right, towards the diaphragm. The tumor moves freely with respiration.

A nephrectomy by Dr. S. J. Mixter. Recovery. Confined to bed with malignant disease of abdominal organs, dying November 4, 1905.

Pathological Report.—The specimen consisted of a rounded growth from the kidney 14 cm. in diameter, from the surface of which considerable fat was removed. On section the growth consisted of a cavity 10 cm. in diameter, filled with thick yellow pus. The cavity contained a flattened stone 1 cm. in diameter and a rounded mass of tissue 3 cm. in diameter covered with fibrin. The rest of the mass was composed of a soft tumor of translucent, red, grayish color, 5x7 cm. in diameter. Scattered throughout this were many bright yellowish areas. The growth was divided into cross lobules by bands of fibrous tissue extending down from the capsule.

Microscopical examination showed soft masses of large endothelial-like cells often arranged in columns. Nuclei were round and vascular, and a large amount of cytoplasm, and most cells showed fatty degeneration. In places the tumor was very vascular and in others extensively necrotic, these latter areas being infiltrated with large numbers of leucocytes and round cells.

Diagnosis, hypernephroma.

(Signed) W. F. WHITNEY, M.D.

CASE VII.—J. H., a man, thirty-seven years old, single. M. G. H. records, vol. 490, p. 25. October, 1904. Last June he stopped work because of soreness and pain in the right loin upon moving at his work. This condition came on in a week and has persisted since. No blood detected in the urine. Three years ago he had typhoid fever. Heavily alcoholic up to four years ago. Nothing abnormal found in either heart or lungs. No rigidity of abdomen and no tenderness. In the right loin there is a soft mass. The kidney is palpated with ease. Bimanually, it can be slid up under the cartilage of the ribs, and can be displaced almost to the iliac fossa when the patient is lying on his side.

Operation by Dr. J. C. Warren. Nephrectomy. Died in August, 1905, of "liver complaint."

Pathological Report.—A lobulated new growth, 6 cm. in

diameter, situated on section of kidney. On section, of a variegated yellow, red appearance, somewhat lobulated in structure and soft in quality. The large veins in the pelvis were filled with a similar new growth, as was also some veins in the lower part of the kidney. The rest of the kidney-structure was normal in character.

Microscopical examination showed a structure composed of large cells with rather clear protoplasm, and its end edges separated into a rather lobular arrangement of thin glands of connective tissue and small thin-walled vessels. Hypernephroma.

(Signed) W. F. WHITNEY, M.D.

CASE VIII.—J. H., seventy-five years old. November 1, 1904. Hospital number, 139,906. Autopsy, No. 1270. He has had a bad cough for years, and pains for six months in the left eye and frontal region. He has lost weight. He fell on the kitchen floor and fractured his thigh, and was then brought to the hospital. The patient is an emaciated old man, having arteriosclerosis. The left eye-ball is protuberant. A firm, hard, tender mass is attached to the roof of the left orbit. Many nodules are scattered over the body, the size of a chestnut to a large walnut. There is one ulcerating mass over the sternocleidomastoid muscle and one over the right scapula. The nodules are firm, moving in the skin, not tender or red. No tumor is felt in the abdomen. The urine is normal. The left femur is fractured at its middle. The usual Buck's extension was applied. The patient died two days later.

Autopsy by Dr. J. H. Wright, November 5, 1904. Anatomical diagnosis: Hypernephroma of the right adrenal. Metastases in the retro-peritoneal tissue, intestines, liver, lungs, pleura, myocardium, brain, subcutaneous tissue in various regions, left orbit and *left femur*. Local pneumonia of the superior lobe of the right lung. Adenoma of the prostate. Chronic pleuritis of the right lung.

CASE IX.—E. F. H., a man, thirty-three years old. M. G. H. records No. 135,648. January, 1904. For six years he has noticed a pimple upon the pinna of the right ear. This has gradually increased in size. Three years ago it had reached the size of the end of a thumb. It was cauterized. It recurred and grew rapidly. It has never been painful. It bleeds from the surface upon slight trauma. The urine is normal. The abdominal examination finds

nothing abnormal. The right ear-lobe and cartilage are changed to a foul, sloughing, bleeding mass. There are enlarged glands in the neck upon the right side. Operation by Dr. F. B. Harrington. Removal of ear and dissection of the right side of the neck.

Pathological report by Dr. W. F. Whitney.—The microscopical examination of the mass removed showed a lobular growth of large round cells, with little intercellular substance between them here and there.

Diagnosis.—Large round-celled sarcoma (hypernephroma).

May, 1904, the man entered the service of Dr. M. H. Richardson. The urine showed sp. grav. 1025; a very slight trace of albumen; no sugar; rarely a cast, a few squamous and round cells; a few red blood corpuscles. The wounds of ear and neck had healed. The man had lost thirty pounds in three weeks past. He complained of great pain in the shoulder and because of it was unable to sleep. He died June 22, 1904.

A complete autopsy by Dr. J. H. Wright. Hypernephromata of the adrenals. Metastases in the intestines, stomach, great omentum, mesocolon, retroperitoneal tissue, pancreas, peritoneum, right groin, right shoulder joint (*upper end of the right humerus*), subcutaneous tissues of the trunk, and brain.

CASE X.—W. W., sixty-five years old, married. Mass. Gen. Hospital, No. 143,207. June 28, 1905. Patient has always been well. During the past four months he has lost forty-five pounds in weight. A few weeks ago he noticed a swelling in the left scrotum. Has had dyspepsia for several years, of a mild type. Has been getting more and more constipated. Has never passed blood in the stools. He presents a cachexia. The abdomen is moderately distended. The left hypochondrium is occupied by a bulging tumor, which is elastic, smooth, semi-fluctuating, about the size of a foot-ball. The liver is palpable just below the right costal margin. There is a large varicocele in the left scrotum. The colon overlies the tumor.

An operation was done for the removal of a portion of the abdominal tumor for diagnosis, July 1, by Dr. J. G. Mumford. Patient died July 12, 1905. There was no autopsy.

The pathological report by Dr. C. C. Simmons of the bit of tissue removed from the abdominal tumor is as follows:

The specimen consisted of an irregular dark-colored mass of

fibrous tissue 10x12 cm. in diameter. On section portions of the mass were of a grayish translucent color, while other places were necrotic or hæmorrhagic. Microscopical examination showed solid masses of large cells arranged roughly in columns and having sharply-marked outlines and clear protoplasm. The nuclei were large and many of them vesicular. There were large numbers of mitotic figures. In places there were spindle-shaped cells, many of which were also undergoing mitosis. Hypernephroma.